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SAN BENITO COUNTY

SEISMIC SAFETY / SAFETY ELEMENTS

GENERAL PLAN REVISION

1980

PREFACE

Counties and cities in the State of California have been required by State law to prepare Seismic Safety and Safety Elements as two of the nine mandated elements of the General Plan. Both Elements joined State statute in 1971 and both are aimed at reducing death, injuries, damage to property and economic and social dislocation. The emphasis of the Seismic Safety Element is on geologic hazards while the Safety Element focuses primarily on fires in wildland areas adjacent to urban development. It also addresses other locally relevant safety issues such as urban structural, fires and hazardous materials.

Because of the overlap between the two, the Safety and Seismic Safety Elements have been published together. The policies and proposals of these elements are coordinated with those of the Land Use and Open Space Elements.

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SEISMIC SAFETY ELEMENT

LEGISLATIVE INTENT

California Government Code Section 65302(f) states, in part:

> ... A seismic safety element consisting of an identification and appraisal of seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to ground failures, or to effects of seismically induced waves such as tsunamis and seiches.
>
> The seismic safety element shall also include an appraisal of mudslides, landslides, and slope stability as necessary geologic hazards that must be considered simultaneously with other hazards such as possible surface ruptures from faulting, ground shaking, ground failure and seismically induced waves...
>
> Each county and city shall submit to the Division of Mines and Geology of the Department of Conservation one copy of the seismic safety element and any technical studies used for developing the seismic safety element.

The Seismic Safety Element aims at reducing loss of life, injuries, damage to property and economic and social dislocation resulting from earthquakes and other geologic hazards. The Seismic Safety Element is primarily a vehicle for identifying hazards that must be considered in planning the location, type and density of development (State of California, General Plan Guidelines, OPR, 1980, page 101).

COUNTYWIDE POLICIES AND OBJECTIVES

(As they relate to the Seismic Safety Element)

1. To direct future county growth to areas which are neither environmentally sensitive nor of substantial future agricultural importance.

2. Encourage industry which is sensitive to and compatible with the environment and surrounding land uses.

3. Encourage development of recreational facilities, such as riding stables, golf courses and camping facilities.

4. The encouragement of building in areas that are not environmentally sensitive.

PHYSICAL SETTING AND HAZARDS

PLANNING AREA CHARACTERISTICS

The County of San Benito is located in the Central Coast Range of California. The Diablo Range borders the County to the east and the Gabilan Range to the west. The two urban centers, San Juan Bautista and Hollister, are located on the nearly flat valley floor between these ranges, in the northern portion of the County. The valley floor is underlain by geologically young, unconsolidated stream deposits. The floor gives way to low foothills and piedmont slopes to the west and east. These older deposits have been locally modified by renewed surface erosion. The higher and steeper mountain areas of the two mountain ranges are underlain by a variety of semiconsolidated to consolidated bedrock materials.

San Benito County, like most of California, is in a highly seismic area. The probability of a major earthquake occurring in the near future is a factor with which we must live. Communities in California are particularly vulnerable to earthquakes because of the very active San Andreas Fault system, which is capable of generating large, destructive earthquakes. The San Andreas Fault system extends from the Gulf of California in northern Mexico northwestward through Western California and into the Pacific Ocean off Point Arena, a distance of more than 600 miles. The San Andreas Fault has been mapped from the northern portion of the County, a short distance east of Aromas diagonally through the entire length of the County, passing immediately east of San Juan Bautista and emerging at the southern border of the County, approximately 3.5 miles west of Priest Valley.

The Hayward/Calaveras Fault passes through Santa Clara County and enters San Benito County at San Felipe Lake, terminating at a point just south of Hollister. Numerous other faults, both named and unnamed, have been mapped within the County. Some of these faults are active, others have had no movement observed on them during recorded history (see Plate 8 of the Open Space/Conservation Element).

Other geologic hazards in the Planning Area include landslides, soil erosion and deposition, flooding and expansive soils.

SEISMIC HAZARDS

The first task in any seismic assessment is to identify and characterize the faults that will most likely generate significant earthquakes. The San Andreas Fault extends the full length of the county. The Hayward/Calaveras Fault extends from immediately south of Hollister through the northern portion of the County and on into the San Francisco Bay Region. Both of these fault systems have about equal potential to produce damage. The greater length of the San Andreas Fault suggests that it is capable of generating larger earthquakes than the Hayward/Calaveras Fault.

Earthquakes on the San Andreas Fault were assigned a Probable Intensity Distribution ranging from magnitude 6.0 to 8.3 in a report entitled "A Study of Earthquake Losses in the San Francisco Bay Area (Algermissen, 1972). The projected Intensity Distributions are largely based on observed intensity patterns of the 1906 San Francisco earthquake.

Variations of intensity will occur from place to place, due to local variations in the geologic and soils conditions. This is especially true for areas such as Hollister and San Juan Bautista, where the earth materials vary in thickness, consolidation, grain size, sorting and water saturation.

Earthquakes of different magnitudes along the San Andreas system will not only create different intensities of ground shaking, but will also generate earthquakes with different frequencies, accelerations, velocities and durations. These characteristics are very important parameters for design of earthquake resistant structures and, like intensities, they are commonly controlled by the dynamic properties of rock and soil along the transmission path of the seismic waves.

Active faults within the State of California have been of such importance that the Legislature passed Chapter 7.5, Division 2 of the California Public Resources Code, which required that the State Geologist provide Special Studies Zone Maps to delineate areas of known active faulting. Numerous other studies have been undertaken by state and federal agencies. With few exceptions, these studies either show faulting at a very small scale with little detail or at a very large scale with great detail. neither scale is useful for General Plan puposes.

One study, the 1973 Geology of California Maps prepared by the California Division of Mines and Geology, is at a scale identical to that

used for the General Plan (1" = 4 miles). Faults shown on the Santa Cruz Sheet (N10-12) are shown on Plate 8 of the Natural Resources Inventory, prepared for the Open Space/Conservation Element, along with the Special Study Zones. Where the two sources overlap, only the Special Study Zone is shown.

GROUND SHAKING

Earthquake generated ground shaking, in many instances, causes the most widespread earthquake damage (Nichols, 1974). This phenomenon is considered to be potentially the most hazardous in many areas. It affects the greatest number of people and is present, to some extent, in all earthquakes. Ground shaking is also one of the most difficult of earthquake hazards to predict or quantify.

In a broad sense, the severity of ground shaking appears to be related to the firmness of the ground. Areas underlain by thick, saturated, unconsolidated sediments, such as those found in the Hollister and San Juan Valleys, will experience greater shaking motion than areas underlain by firm bedrock. In other words, ground shaking will have a lesser affect on buildings and persons in areas of hard granite than it will on buildings and persons located on thick beds of sand or other unconsolidated sediments.

Additional factors in the assessment of ground shaking severity and associated damage include the magnitude of the earthquake, the acceleration, the number of shocks, the duration of the shocks, the distance from the epicenter, the structural integrity of the building and the relationship between the waves or vibrations of the ground motion and the fundamental period of the building. The fundamental period of the building is controlled by its height, while the fundamental period of the ground movement is controlled by the local geologic and hydrologic conditions. Damage is particularly likely to occur when the natural vibration or period of a building is similar to that of the soil deposit on which it is constructed.

Damage to structures is caused by the transmission of earthquake waves from the ground into the structure and back again.

Attempting to predict how the ground surface at any given location will react to an event such as a maximum probable earthquake (the largest earthquake which can be reasonably expected to occur in the foreseeable future)

is a difficult and complex undertaking. Within the San Benito County area, detailed data on the dynamic properties of the surface and sub-surface earth materials are insufficient to precisely define ground surface response to the maximum probable event. The seismic response of unconsolidated alluvium and soils is so highly variable that, even with good sub-surface data, it is difficult to accurately predict the ground surface acceleration.

Based upon physical characteristics within San Benito County, some general observations can be made. In general, more damage from ground shaking can be expected in areas underlain by thick, unconsolidated, fine-grained, water soaked alluvial sediments than an area underlain by firm, dry, rigid bedrock, which in turn is covered by a very thin soil.

Ground water conditions would appear to fluctuate locally and this will strongly influence the intensity of ground shaking. Where ground water is shallow, the alluvial materials will be saturated and thus will respond to earthquakes more severely.

GROUND FAILURE

Earth materials in a natural condition tend to reach an equilibrium over a long period of time. In geologically active areas there are many regions where earth materials have not yet reached a natural state of stability. In addition, man's activities tend to make earth materials less stable, and increase the chances of ground failure. Some of the natural causes of instability are earthquakes, weak materials, erosion, and rainfall. Human activities which contribute to instability include over-steepening of slopes by undercutting or overloading them with artificial fill, extensive irrigation and poor drainage. Ground withdrawal with removal of stabilizing vegetation can also contribute to the instability of earth materials (Nichols 1974). These everyday causes of failure can produce landslides or settling and are enhanced during earthquakes by the strong ground motion which results in rapid changes in these materials.

Various processes and phenomena are grouped within the general classification of ground failure. These include landsliding, liquefaction, lateral spreading, lurch cracking, differential settlement, and bedrock shattering. All of these involve a displacement of the ground surface due to a loss of strength or failure of underlying materials during ground shaking.

Landslides and liquefaction are the two most likely forms of ground failure to occur in San Benito County. Ground displacement along the Hayward/Calaveras or San Andreas Fault is taking place daily. This form of movement, called "creep", is not usually damaging to structures on a catastrophic basis. Over long periods of time however, damage to foundations, roads, sidewalks, and utilities does occur.

Liquefaction, the temporary loss of strength recognized as a "quick" condition, can result in ground failure. Liquefaction has been known to adversely affect buildings even when the beds which liquefy are located at depths of 30 and 40 feet. Structures may rotate or slowly sink into the soil.

In more urbanized areas of Hollister and San Juan Bautista, water levels vary from 80 to over 200 feet. Areas of perched water could bring water levels much closer to the surface and increase the potential for liquefaction.

Some local areas in San Benito County, where ground water is near the surface, are vulnerable to this problem. In such areas, during a large earthquake, building foundations may sink or tilt several feet into the underlying soil. Differential ground subsidence may occur or slope failure may take place along unsupported slopes, such as creek banks or road cuts.

Lateral spreading is the horizontal displacement of flat lying alluvial materials toward an open of "free" face, such as the steep bank of a stream channel or river bank. This movement is due to failure, perhaps liquefaction, of one or more layers of alluvium exposed in the free face.

Lurching is also referred to as ground fissuring or ground cracking. It is the fracturing and displacement of the ground surface, sometimes resulting in local subsidence and further ground fracturing. Lurch cracking is sometimes due to local liquefaction of sub-surface materials.

Some risk of lateral spreading and lurch cracking exist along the banks of the San Benito River and many of the tributaries to the river.

Landslides involve a downslope movement of soil or rock materials and can range from rock falls to earth flows. Earthquake induced landslides will occur generally in the same areas as landslides induced by other natural forces. The addition of earthquake energy may induce landslides that otherwise might not have occurred.

Regardless of the source, landslides are due to the failure of either

surficial material or, in some cases, bedrock. Failures usually result from a combination of factors including unstable or weak rock and soil materials, adversely oriented geologic structures, insufficient vegetative cover, high water content, over steepened slopes, or high slope angles.

Urban development can affect landslide potential by increasing slope angles, removing downslope supporting earth materials, adding weight upslope of fill or construction, and the addition of water by gardening, septic tank effluent, or the directing of surface drainage into unstable areas. The area northeast of San Juan Bautista, known as the Sargent Anticline (a portion of Flint Hills) is an excellent example of an unstable area which contains landslides resulting from both earthquake generated forces, man-made forces, and the addition of rain water.

GROUND RUPTURE

The San Andreas and Calaveras Fault Zones are considered to be active faults in San Benito County. (The term "active" for this report is the same as the one officially adopted by the State Mining Geology Board with reference to the Alquist-Priolo Geologic Hazard Zones Act that includes faults that have moved within the last 11,000 years.)

In compliance with the Alquist-Priolo Geologic Hazard Zones Act, the California Division of Mines and Geology has established Special Study Zones along fault traces considered active or potentially active. Special studies relating to earthquakes are required before development within these zones can occur. The boundaries of these Special Study Zones are shown in Plate 8 of the Natural Resources Inventory compiled for the Open Space Element. The reader is cautioned that more detailed official maps at one inch equals 2,000 feet are available for viewing in the Planning Department and at the County Clerk's Office.

Vertical and horizontal displacement has occurred along both the San Andreas and Hayward/Calaveras Faults. It is reasonable to assume that displacement will occur along these faults in the future.

Fault creep, the slow but steady movement along a fault zone, has deformed numerous streets, curbs, gutters, and homes in the community of Hollister. Creep along the San Andreas Fault is visible in the San Juan-Hollister Road area just east of The Alameda in San Juan Bautista. Continuous repairs are required both on state and county roads as a result of this slow, but damaging, movement.

LANDSLIDE SPLASH HAZARDS (Seiche)

If a large earthquake generated landslide should enter the Hernandez Reservoir, or any of a number of privately owned reservoirs, a wave could be generated that could damage shoreline development and possibly overtop the dam. Factors to be considered in a site-by-site evaluation should include the length of time that the reservoir is full or nearly full, the depth of the water, and the configuration of the water surface, as well as the downstream topography.

Although the chance of the complete failure of the Hernandez Reservoir is remote, it does exist. Little damage is likely to occur due to the remote location of the dam. However, proposals for development in the area should include an analysis of the potential for inundation damage.

FLOOD HAZARDS

Flood Hazards are shown on Plate 6 of the Natural Resources Inventory, prepared for the Open Space/Conservation Element. Flood hazard areas are confined, for the most part, to agricultural uses at the present time.

The flood season generally lasts from November through April. Over 90% of the annual precipitation falls during these months. Statistically, January has been the wettest month.

At the present time most of the land subject to flooding within San Benito County is in agricultural use.

The flood prone areas, shown in Plate 6 of the Natural Resources Inventory, prepared for the Open Space/Conservation Element, are based on the November, 1979, National Flood Insurance Program Maps delineating flood hazard boundaries.

These flood prone areas have a one-in-100 chance, on the average, of being inundated during any year.

More commonly referred to as the 1% flood, the flood-way is the channel of a stream that must be kept free from encroachment in order that a 100-year flood might be accommodated without substantial increase in flood height.

The flood-ways in San Benito County are restricted almost entirely to areas immediately adjacent to either side of river and creek channels. In the northernmost portion of the County, the Pajaro River has the potential of inundating much larger areas, but as is shown on the map, most of the flood waters are expected to be contained within the Tequisquita Slough.

In addition to exposure to flooding from overbank flow in local streams and rivers, portions of the county would be subject to inundation in the event of the failure of dams. These dams are considered to be safe by the California Division of Safety of Dams, however, state law requires maps to be prepared by dam owners indicating the extent of areas subject to inundation in the event of dam failure. Seismic stability studies would be needed to provide information on the probability of dam failure due to seismic effects.

EROSION

Erosion is a normal, ongoing geologic process that should be considered in land use planning. Major problems can be avoided if the process is understood. The erosion potential throughout the valley floor of San Benito County is low. Moderate potential exists on the lower slopes at the sides of the valley, while the mountainous areas on either side are highly erodible. Stream bank erosion may occur during periods of high water. During floods, waterborne sediment may be deposited on the valley floor, principally within the flood plain.

Additional information on erosion, a little of the background and an evaluation of erosion hazards in more detail is provided in the Natural Resources Inventory prepared for the Open Space/Conservation Element (see page 8).

SEISMIC SAFETY POLICIES AND ACTIONS

OVERVIEW

The basic purpose of the Seismic Safety Element is to provide a policy basis for future steps which the County can take to prevent the loss of life, to reduce injuries and property damage and to minimize economic and social dislocations which could result from a major earthquake.

Although many factors in addition to seismic safety are involved in determining the appropriateness of use of any site or land area, the following guiding principles are adopted:

POLICY #1

In general, urban expansion should be directed to areas of least risk from natural and man-made hazards.

ACTIONS

a. In areas susceptible to landsliding, the County should adopt a non-residential or very low density residential land use policy.

b. Residential development should avoid canyon bottoms, particularly where flanked by high, steep canyon walls.

c. In hilly terrain, clustering of residential units should be encouraged as an alternative to developing numerous individual lots over a large area.

d. Clustering should be required when pre-development investigations indicate a large portion of the site is potentially unstable and when corrective measures would be geotechnically or economically unfeasible.

e. Proposed developments sited within larger areas of known or suspected instability should be deferred until detailed area-wide studies are completed which evaluate the extent and degree of instability and its impact on the overall development of the area.

f. Require setback distances from fault traces should be determined by individual site specific surface rupture investigations.

g. The probable performance of structures proposed in those portions of the county with high liquefaction potential is difficult to predict and should be the subject of detailed site specific liquefaction studies.

POLICY #2

Except for utility lines and transportation links, critical facilities and occupancies should not be located in High Hazard Areas.

ACTIONS

a. In areas identified as geologic or seismic hazard areas in the Open Space/Conservation Element development should be permitted only with a Use Permit.

b. The County should develop standard conditions for Use Permits within high seismic hazard areas which require site specific geologic, soils or other investigations be made and the structures involved designed and constructed to withstand the "maximum probable" earthquake or other identified potential hazards, with damage limited to an acceptable level (Acceptable Risk is discussed in Appendix A).

POLICY #3

The diversity of housing types within San Benito County should be evaluated with regard to suitable locations for high density housing. The location of buildings three stories and higher should be carefully examined in relation to ground shaking characteristics, potential for ground failure and other seismic hazards.

ACTION

a. For R-3 density or greater within Group 4 (Table 2) or buildings three stories and higher, two physical studies should be undertaken. One, to determine ground shaking characteristics, and the other to evaluate the potential for ground failure and to identify and mitigate any other geologic hazards which may exist on the site.

POLICY #4

It is the County's policy that where there is a coincidence of high agricultural productivity and high geologic hazards the land should be retained in agricultural use to serve dual open space functions (the production of food and fiber and the protection of health and safety) wherever reasonable in relation to parcel size and established use patterns. It is the County's policy to adopt zoning categories and scenic easements for the protection of environmentally hazardous or aesthetically valuable resources.

ACTIONS

a. The County shall establish an Overlay Zoning District for environmentally hazardous areas (an "EH" District), which discourages development in areas geologically hazardous to the health, safety and welfare of the citizens of the community and will concurrently develop density transfer policies which would allow for the transfer of some of the densities, which may have been allowed in hazardous zones.

POLICY #5

It will be the County's policy to identify and may abate existing structures which will be hazardous during an earthquake. Included would be those of high occupancy, public structures or any structures, the dangers of which, affect the general public.

ACTIONS

a. The County will identify those structures and features likely to fail and cause personal injury or death to occupants or to severely disrupt services vital to the functioning of the community and needed post-disaster recovery. Since a comprehensive survey of all structures and facilities within the county would be time consuming and costly, it is suggested that priorities be established to enable staff to focus on cost effective measures and at the same time provide information needed to significantly reduce risk and identify measures needed to provide reasonable assurance of facilities required for post-disaster response would be operable following a great earthquake.

b. The County should supplement certain portions of the Uniform Building Code with regulations for dangerous buildings. The Ordinance should be applicable to a large number of older buildings, which do not have earthquake resisting structural systems, as well as to crumbling and dilapidated structures, which are manifestly unsafe. The Ordinance should include reference to parapets, marquees, appendages and other non-structural or non-resistive construction, which constitute earthquake hazards.

c. The County may initiate a long-range program for the elimination of existing hazardous buildings and develop equitable rules, which will eventually eliminate these structures without undue economic hardships and relocation problems.

d. Historic community values should be reviewed in relation to struc-

tural conditions, degree of hazard and measures needed for safety. The review should involve persons with special knowledge of historic and other community values. Efforts should be made to preserve the essential qualities of the building, while improving structural and fire safety.

POLICY #6

It will be the County's goal to explore means of providing additional geotechnical information to both the public and the County staff in an effort to properly assess seismic hazards. In addition, the county desires to maintain and improve the geotechnical data base and will take positive steps to do so.

ACTIONS

a. The County will explore the possibility of providing more detailed geotechnical information through special grants at both state and federal levels.

b. A public file will be kept of all site specific geotechnical and soils investigations.

c. A Seismic Hazards Map will be made readily available to the public and will be updated immediately upon receipt of additional information.

POLICY #7

This policy is related to disaster preparedness planning and is found on page 18.

GUIDELINES TO THE LOCAL PLANNING PROCESS

The means for implementing seismic safety policies to reduce risk from geologic and other hazards can be achieved through implementing specific actions within five general areas. These specific areas range from relatively general (the General Plan) to the detailed (Environmental Impact Reports). Progressing from the more general to the most specific, these areas are:

1. General Plan
2. Zoning Regulations
3. Development Regulations
4. Building Code Enforcement
5. Environmental Impact Reports

The implementation of the Seismic Safety Element can occur at one or more stages of the local planning process. The relationship between seismic hazards and the planning process is shown in Table 1 below.

The following general guidelines apply to Table 1:

1. A means should be provided by which the data necessary for adequate seismic evaluation will be updated and superseded as more accurate or more specific data become available.

2. In formulating regulations, particular care should be exercised to recognize the level of generality of the data on which this element is based.

3. In administering regulations requiring the submission of additional and more precise geologic studies, the county should engage the services of a qualified professional to determine the adequacy of the data submitted.

4. At a minimum, compliance with Chapter 70 of the latest edition of the Uniform Building Code should be required and where appropriate, Chapter 70 should be modified to meet local building conditions.

5. Site development regulations should include or require a two-phase procedure for investigation of all sites in high seismic areas. The first phase should be a preliminary investigation to evaluate the general nature of hazards and the need, if any, for further study. The second phase of the investigation should be a detailed investigation of those hazards identified in the first phase investigation.

TABLE 1

SEISMIC HAZARDS-PLANNING PROCESS RELATIONSHIPS

	SURFACE RUPTURE	LAND-SLIDES	GROUND SHAKING	LIQUEFACTION & GROUND FAILURE	SEISMICALLY INDUCED INUNDATION
General Plan	X	X		X	X
Zoning Regulations	X	X		X	X
Development Regulations	X	X		X	X
Building Code Enforcement		X	X	X	
Environmental Impact Evaluation	X	X	X	X	X

SOURCE: Seismic Safety Element, General Plan, City of San Jose; modified by TERRA-SOL, LTD., 1980.

STRUCTURAL HAZARDS ABATEMENT POLICY

HISTORY

Prior to the great earthquake of 1906, building design for seismic forces probably was under no limitation beyond the designer and builder's knowledge of basic good construction. The reports of leading engineers following the 1906 earthquake indicate that at least some of the effects of earthquake forces on structures were understood.

The inherent weaknesses and deficiencies of buildings constructed in the three decades following the San Francisco earthquake was not generally recognized until the earthquakes of Santa Barbara (1925) and Long Beach (1933). As a result, the Field Act of 1933 provided for review of design and construction of public school buildings by a State agency. At about the same time some building codes, including the UCB, initiated the first requirements for earthquake resistant design. Present efforts are directed

towards strengthening the code to correct some deficiencies which have been revealed by recent earthquakes and to take into account more fully the relationship between the structure and the soil condition of its site.

In San Benito County, the greatest risk of life stems from existing structures which were inadequately constructed or have been improperly maintained. In many cases, the greatest hazard is not necessarily from the building's collapse, but from falling objects, such as decorative ornaments, brick veneers, chimneys or glass.

Where historic buildings or other buildings contributing to the character of San Benito County are involved, the preservation of these important qualities must be carefully considered in the hazard reduction program. The socio-economic aspects of hazards abatement costs of displacing persons and economic activities must be weighed against the benefits to be secured (William Spangle & Associates, 1977).

DISASTER PREPAREDNESS PLANNING

BACKGROUND

Preparedness for earthquakes and other disasters begins with an understanding of the threat and how to respond. Clearly, the problem of earthquake disasters is an ever present threat in San Benito County. San Benito County has a Civil Disaster Program, which is under the jurisdiction of the County Sheriff.

The planning responsibilities include all conceivable activity involved in preparing for emergency operations. Among these are search and rescue, evacuation, mass shelter, providing of food and food distribution, assessing damage and providing emergency transportation. Other equally important categories include traffic control, fire suppression and prevention, emergency utility services and a coordination of volunteer help.

Disaster preparedness planning for San Benito County is based on the premise that local emergencies must be dealt with quickly and effectively by local forces.

The assumption is also made that any major disaster emergency will require outside assistance from other County, State or Federal sources.

The County is also aware that if an emergency situation impacts a wide geographical area, the heavy urbanized areas of the State will receive aid and assistance before the more rural areas. For this reason, local supplies of food, water and medical supplies should be kept available sufficient to sustain the local population for several days after a disaster.

Although some aspects of emergency plans may be adequate in earthquake related emergency situations, there are some potential situations which are unique to earthquake disasters. It should be taken into account in disaster preparedness and contingency planning.

It may not be possible or practical to develop and maintain completely current contingency plans for every type of potential emergency. However, the community should be aware of the potential problems that might arise during a severe earthquake. The County's disaster preparedness planning should enable the response to a severe earthquake to be as flexible as possible. While the existing County plan is basically well designed, covering both natural and man-made disasters, certain weaknesses exist in the program. Efficient functioning of the plan relies on swift, knowledgeable action on the part of the staff. Unfortunately, the respon-

sibility of disaster preparedness is an addition to the full workload required of the County Sheriff. The lack of disaster simulation exercises presents a major shortcoming in communications. For example, personnel at Hazel Hawkins Hospital were unaware of the 200 bed packaged disaster hospital located in Bolado Park. On the positive side, the hospitals have self-contained power generating facilities and excellent emergency plan (revised 1980) supplies are on hand for a minimum of one week with medical supplies being available for 30 to 60 days depending upon the item.

The emergency communication center is located in the basement of the County jail situated on Fourth Street, two blocks west of San Benito Street. The communications center is located almost midway between two major fault zones on alluvial materials and could be subject to severe damage in the event of a large magnitude earthquake.

POLICY #7

It is the County's policy to maintain a reasonable level of disaster preparedness for the protection of the health, safety and welfare of the citizens of San Benito County.

ACTIONS

a. Highest priority should be given to investigating the seismic response of emergency facilities, such as fire stations, hospitals and communications centers, which are located in potentially hazardous areas. The County should encourage the agencies involved to investigate these facilities as well as the adequacy of other facilities which have low levels of acceptable exposure to risks, such as schools and major utility lines located in potentially hazardous areas.

b. It will be the County's policy not to approve critical and emergency facilities proposed to be located in hazardous areas unless this is unavoidable. (This may be unavoidable where utility lines must pass through hazardous areas to serve the community or where emergency facilities must be located in areas which could be isolated from similar facilities in other parts of the County following an earthquake. In all cases, the most stringent structural and engineering requirements will be applied in the design of these facilities, as they must remain functional during and after an earthquake).

c. The San Benito County emergency plan should be updated to include an aerial reconnaissance of rivers, streams and major tributaries to ascertain whether or not landslides have created artificial dams which in turn could result in sudden severe flood levels in areas otherwise considered safe by local residents.

d. The disaster reponse plan should take into account seismically related problems such as the inundation of large areas as a result of dam failure and the isolation of sections of the community caused by the collapse of bridges. Evacuating or providing emergency service to these areas is of prime importance.

e. An biannual disaster simulation exercise should be held for clarifying and testing staff emergency duties.

APPENDIX A

Acceptable Risk

DISCUSSION OF ACCEPTABLE RISK

The goals and policies discussed in the Seismic Safety Element provide a basis for planning decisions and indicate actions that the County will take to minimize damage and injuries which might be caused by seismic events. The County does recognize that all risks associated with earthquake hazards cannot be eliminated. In executing the Seismic Safety Element, the County will consider each policy in relation to economic factors involved as well as other established goals and policies within other Elements of the General Plan.

In making land use decisions, the County recognizes certain levels of acceptable exposure to risk for various types of land uses and structure types in which failure could be catastrophic, which are required during emergencies or which involve involuntary and/or high occupancy. The basis for establishing acceptable levels of risk are those recognized by the joint committee on Seismic Safety of the California Legislature (Meeting the Earthquake Challenge, January, 1974, page 9).

Table 2 gives the acceptable exposure to risk related to various land uses. Land uses and structural types are arranged below according to the level of exposure to acceptable risk appropriate to each group; i.e., the lowest level of exposure to acceptable risk should be allowed for Group 1 and the highest level of exposure to acceptable risk for Group 7.

TABLE 2

ACCEPTABLE EXPOSURE TO RISK RELATED TO VARIOUS LAND USES

LEVEL OF ACCEPTABLE EXPOSURE TO RISK	LAND USE GROUP
EXTREMELY LOW	GROUP 1: VULNERABLE STRUCTURES, THE FAILURE OF WHICH MIGHT BE CATASTROPHIC - SUCH AS NUCLEAR REACTORS, LARGE DAMS AND PLANTS MANUFACTURING OR STORING EXPLOSIVES OR TOXIC MATERIALS. GROUP 2: VITAL PUBLIC UTILITY FACILITIES, SUCH AS ELECTRIC TRANSMISSION LINES (500 KV), NETWORK TIES (230 KV), AND SUBSTATIONS, REGIONAL WATER SUPPLY DISTRIBUTION FACILITIES, SUCH AS AQUEDUCTS AND VALLEY PIPELINES, TREATMENT PLANTS AND PUMPING STATIONS: AND GAS TRANSMISSION MAINS.
LOW	GROUP 3: MAJOR COMMUNICATION AND TRANSPORTATION FACILITIES, SUCH AS AIRPORTS, TELEPHONE LINES AND TERMINALS, BRIDGES, TUNNELS, FREEWAYS AND OVERPASSES AND EVACUATION ROUTES. WATER RETENTION STRUCTURES, SUCH AS SMALL DAMS AND LEVEES. EMERGENCY FACILITIES, SUCH AS HOSPITALS, FIRE AND POLICE STATIONS, AMBULANCE SERVICES AND POST-EARTHQUAKE AID STATIONS. GROUP 4: INVOLUNTARY OCCUPANCY FACILITIES, SUCH AS CONVALESCENT AND NURSING HOMES, SCHOOLS AND PRISONS. HIGH OCCUPANCY BUILDINGS, SUCH AS THEATERS, ARENAS, LARGE OFFICE BUILDINGS AND HOTELS AND LARGE APARTMENT BUILDINGS OR COMPLEXES.
MODERATELY LOW	GROUP 5: PUBLIC UTILITY FACILITIES, SUCH AS METROPOLITAN FEEDER ELECTRIC TRANSMISSION ROUTES (60 AND 115 KV), WATER SUPPLY TURNOUT LINES AND SEWAGE LINES. FACILITIES WHICH ARE OF MAJOR IMPORTANCE TO THE LOCAL ECONOMY.

TABLE 2
(Con't)

ACCEPTABLE EXPOSURE TO RISK RELATED TO VARIOUS LAND USES

LEVEL OF ACCEPTABLE EXPOSURE TO RISK	LAND USE GROUP
ORDINARY RISK LEVEL	GROUP 6: MINOR TRANSPORTATION FACILITIES, SUCH AS ARTERIALS AND PARKWAYS. LOW TO MODERATE OCCUPANCY BUILDINGS, SUCH AS SINGLE FAMILY RESIDENCES, SMALL APARTMENT BUILDINGS, MOTELS AND SMALL COMMERCIAL/OFFICE/PROFESSIONAL LIGHT INDUSTRIAL BUILDINGS. GROUP 7: VERY LOW OCCUPANCY BUILDINGS, SUCH AS WAREHOUSES, STORAGE AREAS AND FARM STRUCTURES. OPEN SPACE AND RECREATION AREAS, FARM LANDS, SANITARY LAND FILLS AND WILDLIFE AREAS.

SAFETY ELEMENT

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SAFETY ELEMENT

LEGISLATIVE INTENT

California Government Code Section 65302(i) states, in part:

> ... A safety element for the protection of the community from fires and geologic hazards including features necessary for such protection as evacuation routes, peak load water supply requirements, minimum road widths, clearances around structures, and geologic hazard mapping in areas of known geologic hazards.

The Safety Element aims at reducing the loss of life, injuries, damage to property and the economic and social dislocation resulting from fire, geologic hazards and other public safety hazards (State of California, General Plan Guidelines, OPR, 1980, page 105).

COUNTYWIDE POLICIES AND OBJECTIVES
(As they relate to the Safety Element)

1. To direct future county growth to areas which are neither environmentally sensitive nor of substantial future agricultural importance.

2. Encourage industry which is sensitive to and compatible with the environment and surrounding land uses.

3. The encouragement of building in areas that are not environmentally sensitive.

OVERVIEW

This Safety Element of the San Benito County General Plan is published in the same volume with the Seismic Safety Element because of the interrelationship of the two elements. Both elements aim at reducing the loss of life, injuries, damage to property and economic and social dislocations. The Safety Element goes beyond the Seismic Safety Element and includes fire and other public safety hazards. Because of the overlap between the two, the Safety and Seismic Saftey Elements can easily be combined. A full analysis of flood, fire and seismic hazards is in the Natural Resources Inventory prepared for the Open Space/Conservation Element. The mapping of these hazards is included in the Open Space/Conservation Element as Plates 6, 7 and 8.

San Benito County, because of its unique combination of vegetation, topography, climate and population, has in some areas a severe wildlife problem. Rugged terrain and highly flammable vegetation make foothills and mountains especially unsafe for residential development unless adequate fire safety measures are taken. Fire safety measures can reduce the exposure of life, property and resources to an acceptable level of risk and provide defensible space that could protect residents and enable fire fighting equipment and personnel to operate during a wild fire.

The Safety Element covers the subject of fire protection which is not covered by any other element in the General Plan. It also includes procedures that must be carried out after any disaster strikes to protect the health, safety and welfare of the citizens of San Benito County.

DISASTER OR EMERGENCY PLANNING

EMERGENCY ORGANIZATION AND FUNCTIONS

On September 10, 1974, the California State Office of Emergency Services approved and filed the San Benito County Emergency Plan. The plan, through County Ordinance #340, establishes a disaster council membership consisting of the Chairman of the Board of Supervisors, the Director of Emergency Services and an Assistant Director, a number of chiefs of emergency services and representatives of civic business labor and other organizations having official emergency responsibility. The disaster council is empowered by the County to develop and recommend for adoption by the Board of Supervisors emergency and mutual aid programs and

agreements as well as ordinances and resolutions or rules and regulations that might be needed to implement emergency plans. The disaster council does not have regular meetings, but instead meets at the will of the Chairman or the Director of Emergency Services.

The Director of Emergency Services was, by ordinance, designated to be the Sheriff of the County of San Benito.

SUPPORTING ORGANIZATIONS AND MUTUAL AID

Supporting organizations and mutual aid agreements exist at several levels. The County emergency organization is supported by emergency organizations within the Cities and County and those of other counties, by the emergency organizations of the State of California and by Federal agencies.

Special districts, their personnel and resources have been incorporated into the County emergency organization.

The American National Red Cross serves the cities and counties of San Benito and will serve as part of the welfare/shelter service in the event of an emergency.

The Red Cross has responsibility to provide relief for the disaster caused needs of persons affected by natural disaster. The Red Cross conducts its programs through local chapters, finances its own natural disaster programs and exercises administrative control over its own organizations.

The County Director of Emergency Services is responsible for arranging, through the Chairman of the local Red Cross chapter, for participation of the Red Cross in the emergency organization of the County.

THE SAFETY PLAN

BASIC EMERGENCY SITUATIONS

The County of San Benito will respond to the following types of emergency situations:

a. Earthquake
b. Floods
c. Fire
d. Transportation and Industrial Accidents
e. Civil Disturbance
f. Storm
g. Collision
h. Epidemic

EMERGENCY RESPONSE

In the emergency plan for the County of San Benito, three stages of emergency situations have been identified. These are emergency possible; emergency expected, and; emergency onset. Each has its own set of required responses by the County.

Post-emergency objectives are aimed at reuniting families and providing essential public facilities and services. The permanent restoration of private and public property, along with the reinstatement of public services, and a review of residual hazards are also objectives of the post-emergency phase of the safety plan.

COMMUNICATIONS

The emergency communication system is centered in the County jail. The message center processes and distributes messages within the center. A number of radio systems are subject to County control and will be used for message transactions. In emergency services, these radio systems include the sheriff, fire department, local government and law enforcement radio systems.

In addition to the County controlled systems, ham radio stations and citizen band stations would be available on a voluntary basis.

Supplementing the County system is the emergency broadcasting system. San Benito County is served by four emergency broadcasting systems. KSCO is a "protected" station. These stations are listed below:

TABLE 1

EMERGENCY BROADCASTING STATION

KSCO	1080 KHz
KSBW	1380 KHz
KMBY	1240 KHz
KOMY	1340 KHz

Source: San Benito County Emergency Plan, 1974

RESCUE SERVICE

The Hollister Fire Department provides rescue training to members of the San Benito County Disaster Corp as well as the assigned regular and volunteer members of the fire department. The department maintains an

emergency van for utilization in extracting victims trapped in vehicles at the scene of serious automobile accidents.

Radiological defense training and medical self-help training is the responsibility of the adult education department of the San Benito County High School. Training, involving communications, earthquake preparation and general orientation of the public, is provided by the civil defense division of the Sheriff's department, while rescue training is provided by the Hollister Fire Department.

In the past, up to 450 persons per year were trained in medical self-help practices.

SAN BENITO COUNTY DISASTER CORP

In 1972, the San Benito County Disaster Corp was formed. Three divisions provide communications, rescue and medical self-help in the event of local emergency and/or disasters.

The Disaster Corp includes licensed pilots, nurses, doctors and other persons who have offered their equipment and services on a volunteer basis. This group would supplement the public safety agencies of the County.

HOSPITALS

The major hospital facility available is the Hazel Hawkins Hospital. The Hospital is capable of maintaining self-sufficiency for a period of one week and possibly two without the need for additional food and supplies. Medical supplies range from a 30 to 60 day period depending upon the item.

In 1968, the United States Government gave the County a 200 bed disaster hospital which is stored in sealed containers at Bolado Park. The hospital includes beds, an operating room and equipment, linen, medicines, and other necessary facilities.

OTHER SERVICES

The County Road Commissioner is in charge of the section for engineering services. He is prepared to repair and restore bridges, water supplies, sewage disposal and handle the clearing of debris.

If additional help should be needed over and above the persons trained, the State Department of Human Resources, working in cooperation with the County Clerk's office, will respond to this need.

Search and Rescue functions are carried out by a group of private aircraft owners and some who have boats which are suitable for this purpose. These services supplement the normal County facilities.

EMERGENCY SHELTERS

There are four licensed shelters within the County. These are listed in Table 2 on the following page.

TABLE 2

EMERGENCY SHELTERS

Location	Facilities
New Idria Mines	Supplies for 45 persons
San Benito High School	Facilities for 225 persons
San Benito County Jail	Facilities for 90 persons
Keystone Seed Company	Facilities for 60 persons

Source: San Benito County Energency Plan, 1974

WATER SUPPLY

Although the County is well supplied with numerous private and public wells, the functioning of these wells depends almost wholly upon electrical service, which in the event of a natural disaster, such as an earthquake, could be rendered inoperable for several hours or even several days. Reservoirs within the cities lack automatic shutoff valves in the event of a ruptured main. Thus, it is conceivable that water supplies would be limited to the water stored in hot water tanks in individual homes for a period of several days.

FIRE SAFETY

The San Benito County fire service is composed of the following regularly organized public agency fire organizations:

1. Hollister City Fire Department
2. San Juan Bautista City Fire Department
3. San Benito County Volunteer Fire Department
4. Aromas Tri-County Fire Protection District

In addition, the California Department of Forestry (CDF) has responsibility for wildland fires within the unincorporated areas of the County and is associated with the County fire service. CDF administers the San Benito County Fire Department under contract with the County.

The San Benito County operational fire service is composed of all County fire districts and the State Department of Forestry. The State

Forest Ranger, California Department of Forestry in Hollister, is designated as the Chief of the San Benito County fire service and is the area coordinator of the State O.E.S. fire and rescue operations.

The California Department of Forestry is charged by Section 4125 of the Public Resources Code with providing wildland fire protection on lands having natural resource value as designated by the California Board of Forestry. There are 805,824 acres of State Responsibility Area within San Benito County. Typically, these lands are the grass, brush and timber covered hills.

Fire protection for the 30,698 acres in the unincorporated area, outside cities, is primarily the responsibility of the County and is designated Local Responsibility Area by the California Board of Forestry. These lands typically comprise the valley floor around Hollister. Structural fire protection is primarily the County's responsibility.

The appropriate fire protection agency should have early input to all development proposals with regard to public fire safety matters.

SAFETY POLICIES AND ACTIONS

The basic purpose of the Safety Element is to provide a policy basis for future steps which the County can take to prevent the loss of life, to reduce injuries and property damage and minimize economic and social dislocations which could result from a major disaster.

The following policies and actions are adopted in addition to those identified in the Seismic Safety policies and actions program.

POLICY #1

Roads should be of adequate capacity for use in times of emergency.

ACTION

a. In accordance with Government Code Section 65302(i), the County hereby establishes a minimum all weather road road width for private driveways serving two or more units as 16 feet.

POLICY #2

It will be the County's policy to review on a biannual basis the Emergency Plan of San Benito County.

ACTION

a. The County will continue its policy of reviewing the disaster plan every two years.

POLICY #3

It will be the County's policy to require that lands which are subdivided and developed in the future to residential or commercial uses be designed and constructed in such a manner that levels of "acceptable risk" identified in Appendix A of the Seismic Safety Element are not exceeded.

It will be the County's further policy that these uses will supply adequate water for normal use and fire suppression. Roads which are suitable for safe passage for emergency vehicles, legible street name signs and two means of access to all parcels except on those with cul-de-sacs 600 feet or less.

ACTION

a. The County will adopt minimum street standards in the subdivision ordinance which will provide a 16-foot all weather road width for private driveways.

b. Adopt and maintain an appropriate fire protection water standard for application to land development.

POLICY #4

It will be the County's policy to update periodically information on existing hazards and reduce the risk from them.

ACTIONS

a. In areas where substandard water supplies exist, the County will take steps to improve the systems.

b. In areas of existing and new development, the County will review road signs and require the placement of legible road signs.

POLICY #5

It will be the County's policy to maintain local police, fire and health forces in a state of readiness to insure adequate protection for the citizens of San Benito County.

ACTION

a. The County will continue its policy of training programs, periodic review of organization and the provisions of supplies, equipment and facilities for use in disaster response.

POLICY #6

It will be the County's policy to cooperate with other local state and federal agencies in the event of a major disaster.

ACTION

a. The County will continue its mutual assistance programs and will work closely with the Cities of San Juan Bautista and Hollister as well as state and federal authorities in assuring emergency preparedness.

POLICY #7

It will be the County's policy to incorporate into subdivision and zoning ordinances those fire safe guides adopted by the Board of Supervisors and entitled "Fire Safe Guides for Residential Development in California (in or near forests, brush and grassland areas)," revised and printed by the California Department of Forestry, May, 1980.

ACTION

a. The County will continue to improve and provide for the safety of the residents of the County by taking immediate steps to modify the subdivision and other appropriate ordinances within the County to incorporate fire safe standards as delineated in the California Department of Forestry publication where they apply to San Benito County.

b. Adopt and maintain a fire protection plan.

c. Adopt those "Fire Safe Guides" as they relate to San Benito County's land use planning, development, open space, conservation, resource management, circulation and housing.

d. Actively support and cooperate with the California Department of Forestry's Range Improvement and Vegetation Management Programs with particular emphasis on their impact on water quality and production, resource management, range management, wildlife habitat management, fire defense improvements and public safety where determined to be appropriate by the County.